

# Comparative analysis of signal processing methods secondary surveillance radar

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**Abstract**—In the paper, based on a comparative analysis of the methods of processing time-interval codes used as secondary surveillance radar information signals consisting of a different sequence of performing joint decoding operations, selecting signals by duration and time position, it is shown that the most effective is the signal processing method in which first the signals are decoded, then the signals are selected in accordance with the duration and in the future with the selection according to the time position, which provides the lowest probability of a false alarm of the first kind.

**Keywords**—secondary security radar; time-interval codes, processing of information signals; the probability of a false alarm of the first kind.

## REFERENCES

- [1] Farina A., Studer F.: Digital radar data processing, Radio i svyaz, Moscow 1993.
- [2] Ueda T, Shiomi K, Ino M and Imamiya K.: Passive Secondary Surveillance Radar System for Satellite Airports and Local ATC Facilities. Proc. of 43rd Annual Air Traffic Control Association, Atrantc City, NJ, USA 1998.
- [3] Ronald Bouwman: Fundamentals of Ground Radar for Air Traffic Control Engineers and Technicians, SciTech Publishing; Annotated edition 2009, [DOI: 10.1049/SBRA008E].
- [4] Mark A. Richards, William L. Melvin, Jim Scheer, James A. Scheer, William A. Holm: Principles of Modern Radar: Radar Applications, Institution of Engineering and Technology 2014.
- [5] Stevens M.C.: Secondary Surveillance Radar, Artech House, Norwood 1988.
- [6] Kim E., Sivits K.: Blended secondary surveillance radar solutions to improve air traffic surveillance. Aerosp. Sci. Technol. 45/2015, 203-208.
- [7] Peter Honold: Secondary radar: fundamentals and instrumentation, Siemens-Aktiengesellschaft, Hardcover 1976.
- [8] Obod, I.I., Strelnitskyi, O.O., Andrushevich, V.A.: Informational network of aerospace surveillance systems, KhNURE, Kharkov 2015.
- [9] Ahmadi Y., Mohamedpour K., Ahmadi M.: Deinterleaving of Interfering Radars Signals in Identification Friend or Foe Systems, 18th Telecommunications forum TELFOR 2010, Serbia, Belgrade, November 23-25, 2010.
- [10] Ray P.S.: A novel pulse TOA analysis technique for radar identifications, IEEE Transactions on Aerospace And Electronic systems, vol.34, No.3, 1998, 716-721.
- [11] Mark A. Richards, William A. Holm, Jim Scheer: Principles of Modern Radar: Basic Principles, Institution of Engineering and Technology 2010.
- [12] Paul A. Lynn: Radar Systems, Springer, Boston 1987, [DOI: 10.1007/978-1-4613-1579-7].